NICMOS Images of Orion

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The Near Infrared Camera and Multi-Object Spectrometer (NICMOS) was installed on the Hubble Space Telescope during a space shuttle servicing mission in February 1997. Using NICMOS, early release observations of the nearest region to Earth where massive stars are being formed—the belt of the constellation Orion—were obtained. These images (shown in the figure) reveal intricate structures in both the near-infrared continuum and in emissions from molecular hydrogen (H_2).

Numerous H_2-emitting knots have been resolved for the first time. Many of these features exhibit prototypical bow-shock morphologies, elongated structures with roughly V-shaped tips. These are interpreted to be lower-excitation analogs of similar structures observed with ground-based telescopes northwest of the core. Many of the elongated H_2 structures and bow-shock features appear to radiate outward from a region very near a radio continuum source, suggesting that the H_2 energetics are dominated by one or more outflow sources in this region. However, the orientations of some features are unrelated to this apparent outflow pattern. Faint continuum features have been detected near the origin; however, no 2-micron emission coincides with this suspected outflow source. The newly resolved H_2 features with bow-shock morphologies are located in regions previously identified as bow-shocks by highly blueshifted components in their line profiles. In contrast, regions of H_2 emission that are diffuse in the NICMOS image have broad, smooth line profiles. Several continuum features have an arc-like appearance, suggesting interactions of winds with the ambient medium. At least 40 stellar or protostellar continuum sources have been detected, including at least one protoplanetary disk and four pairs of binary stars.

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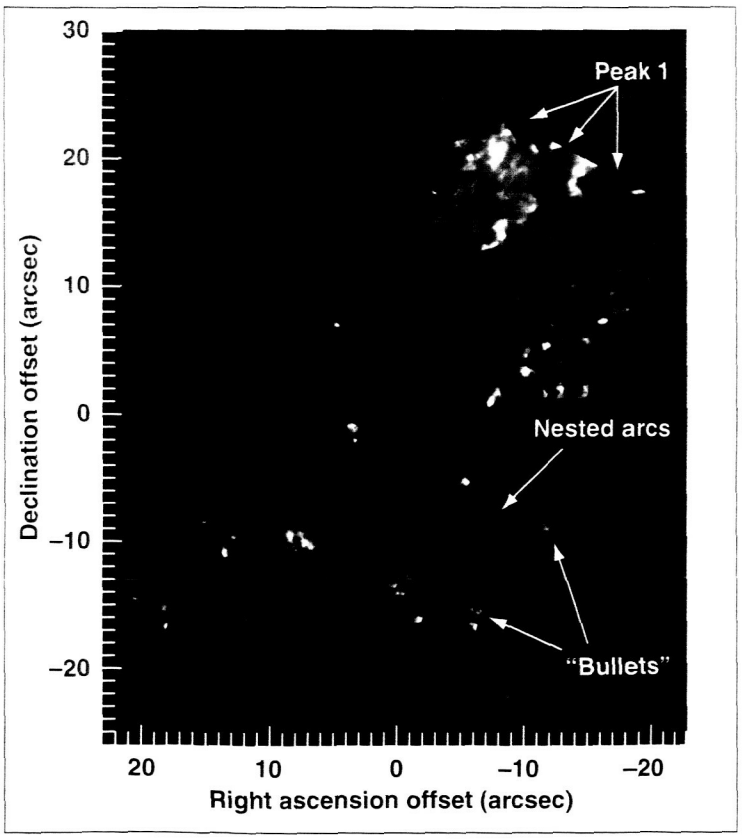

Fig. 1. Molecular hydrogen mosaic of the Orion star-forming region.